

Set up, Applications and Analyses of Fluent, Inc. Software for Simulating Pollutant Dispersion

Scope of Work

The scope of work supports the Environmental Protection Agency's (EPA) critical and high priority need to test a range of set up conditions and evaluate the performance of the numerical simulation of airflow and pollution dispersion around buildings produced using the Fluent CFD (Computational Fluid Dynamics) Software. The numerical simulations resulting from Fluent CFD Software shall be compared with data from EPA field measurement studies, EPA wind tunnel model studies, and other applications of routinely available simplified Air Pollution Dispersion Models. This project supports the development and performance assessment of Fluent CFD Software to determine how it may best be applied by EPA to support the assessment of the potential effects on human health following the events at the New York World Trade Center. The EPA will provide the contractor with specifications for the buildings and atmospheric boundary conditions required to set up each case study. The EPA will provide the contractor with a list of software parameters and a numerical range for each parameter that will be tested to assess their resultant effects. The contractor shall meet with the project officer weekly to present and review results from the previous weeks work. At this meeting, the project officer shall provide new specifications for the next weeks work. The work shall be performed on a part time basis, three days a week since many of the computer jobs submitted each week may require time for completion before results are available for processing and to include in the weekly and monthly progress reports. The work performed under this contract requires the knowledge and expertise covering the routine set up and application of the Fluent Incorporated Software for simulating air pollution dispersion near buildings. The contract work will be at the level of a Physical Scientist with an advanced degree with research experience using Fluent , Inc Software for simulating dispersion near buildings. This contract is to be completed 7 months from the start date.

Task 1:

The contractor shall meet with the project officer once each week to receive and review written instructions defining specifications for Fluent CFD Software set up including the buildings and atmospheric boundary conditions for each case study, the physical processes, list of software parameters and a numerical range for each parameter to be evaluated. The contractor shall work on site at EPA facility in Research Triangle Park, NC in order to meet with the project officer as needed, work with the licensed Fluent CFD Software on the SGI workstation and to submit runs on the EPA SP multiprocessor computer. Access to the EPA computers is not possible off site due to EPA security systems. Analyses of the results may be completed off sight.

The EPA has a Human Exposure Modeling Facility that contains several EPA maintained workstations including a the SGI workstation with licensed Fluent Software and networked to the EPA IBM SP multiprocessor computer. Sole use of this workstation will be provided to the contractor as needed 3 days each week.

Task 2:

The results of the Fluent CFD computer runs completed under Task 1 shall be analyzed and compared with measurement data from field measurement studies, wind tunnel model studies, and simple Air Pollution Dispersion Models. EPA will provide the contractor with all data to be used to support these comparisons. EPA will provide the contractor the software code and users guide for the AERMOD and other simple air pollution dispersion models which will be run to provide other model data for comparison.

Deliverables and Schedule:

1. Weekly Technical Reports summarizing case studies set up and results including a brief description for the previous weeks work with documentation of prepared and produced computer files under Task 1. The preparation of reports on the results may be completed off sight.
2. Monthly Progress Reports referencing and integrating the technical progress provided by the Weekly Technical Reports along with the analyses and comparisons with other data under Task 2. The contractor shall prepare written descriptions that are sufficient in detail to report observed effects on the airflow and pollutant dispersion due to differences in set up and boundary condition parameters. The report shall include written documentation of all computer files (input, set up and output) prepared or produced. The copy of files shall be maintained on a designated EPA computer storage system.

Meetings:

Weekly Meeting to review technical progress and receive technical direction for the next series of computer runs and comparisons.

Performance Period:

Seven (7) months from date of award.